OBSERVATIONS & RECOMMENDATIONS

After reviewing data collected from **CHASE POND** the program coordinators recommend the following actions. *We would like to encourage the association to conduct more sampling events in the future. With a limited amount of data it is difficult to determine water quality trends. Since weather patterns and activity in the watershed can change throughout the summer it is a good idea to sample the lake several times over the course of the season.*

FIGURE INTERPRETATION

- Figure 1: These graphs illustrate concentrations of chlorophyll-a in the water column. Algae are microscopic plants that are a natural part of lake ecosystems. Algae contain chlorophyll-a, a pigment necessary for photosynthesis. A measure of chlorophyll-a can indicate the abundance of algae in a lake. The historical data (the bottom graph) show an *improving* in-lake chlorophyll-a trend, meaning concentrations are decreasing. The chlorophyll-a concentrations in the Pond have been well below the NH mean reference line since 1998. It is important to remember that chlorophyll concentrations can increase or decrease over a short period of time during the summer months. By increasing the sampling program we will be able to better determine the productivity in the pond. While algae are present in all lakes, an excess amount of any type is not welcomed. Concentrations can increase when there are external and internal sources of phosphorus, which is the nutrient algae depend upon for growth. It's important to continue the education process and keep residents aware of the sources of phosphorus and how it influences lake quality.

- Figure 2: Water clarity is measured by using a Secchi disk. Clarity, or transparency, can be influenced by such things as algae, sediments from erosion, and natural colors of the water. The graphs on this page show historical and current year data. The lower graph shows a *stable* trend in lake transparency. The clarity was slightly reduced from last year's reading. If the association chooses to sample more frequently in the future we might find the average transparency will change. The 2000 sampling season was considered to be wet and, therefore, average transparency readings are expected to be slightly lower than last year's readings. Higher amounts of rainfall usually cause more eroding of sediments into the lake and streams, thus decreasing clarity.

- Figure 3: These figures show the amounts of phosphorus in the epilimnion (the upper layer in the lake) and the hypolimnion (the lower layer); the inset graphs show current year data. Phosphorus is the limiting nutrient for plants and algae in New Hampshire waters. Too much phosphorus in a lake can lead to increases in plant growth over time! The upper graph shows an *improving* trend for epilimnetic phosphorus levels, which means levels are decreasing. The lower graph shows a *stable* trend for hypolimnetic phosphorus levels. Phosphorus concentrations in the upper and lower water layer are both below the NH mean reference lines. One of the most important approaches to reducing phosphorus levels is educating the public. Humans introduce phosphorus to lakes by several means: fertilizing lawns, septic system failures, and detergents containing phosphates are just a few. Keeping the public aware of ways to reduce the input of phosphorus to lakes means less productivity in the lake. Contact the VLAP coordinator for tips on educating your lake residents or for ideas on testing your watershed for phosphorus inputs.

OTHER COMMENTS

- Conductivity levels in the epilimnion, Inlet, and Outlet were much lower this year than last (Table 6). It is likely that the increased rains this year helped surface waters remove pollutants by increasing the flushing rate of the pond. Septic system leachate, agricultural runoff, iron deposits, and road runoff can all influence conductivity. The hypolimnion levels did not change much between the two summers.

- Phosphorus concentrations remained low in the Inlet and Outlet (Table 8). The low values indicate there are few human impacts influencing the quality of water in the Chase Pond watershed. This is a positive sign that we will continue to monitor.

- We would like to suggest to the association that our annual visit should occur in June or July next year. Our historical dissolved oxygen (Table 10) shows our visits have traditionally taken place in August. Scheduling the appointment for the beginning of the summer would enable us to monitor the change in dissolved oxygen throughout the summer months.

NOTES

- Monitor's Note (8/3/00): Some construction along Rt. 11. 3 meter sample had a little bit of sediment in it.

USEFUL RESOURCES

2000

A Guide to Developing and Re-Developing Shoreland Property in New Hampshire: A Blueprint to Help You Live By the Water. North Country RC&D, 1994. (603) 536-2146

Septic Systems and Your Lake's Water Quality, *WD-BB-11*, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us
Phosphorus in Lakes, WD-BB-20, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

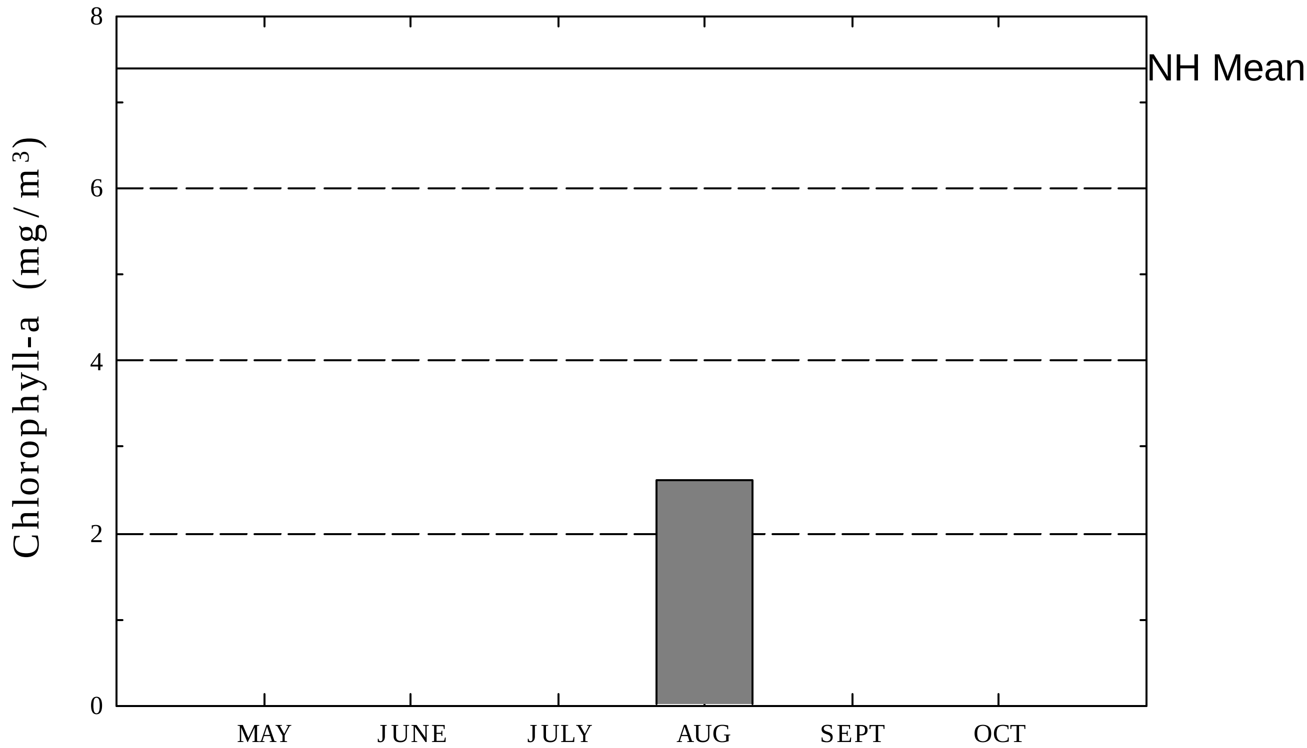
Shoreland Plantings, NH Lakes Association pamphlet, (603) 226-0299 or www.nhlakes.org

Soil Erosion and Sediment Control on Construction Sites, *WD-WEB-12*, NHDES Fact Sheet, (603) 271-3503 or www.state.nh.us

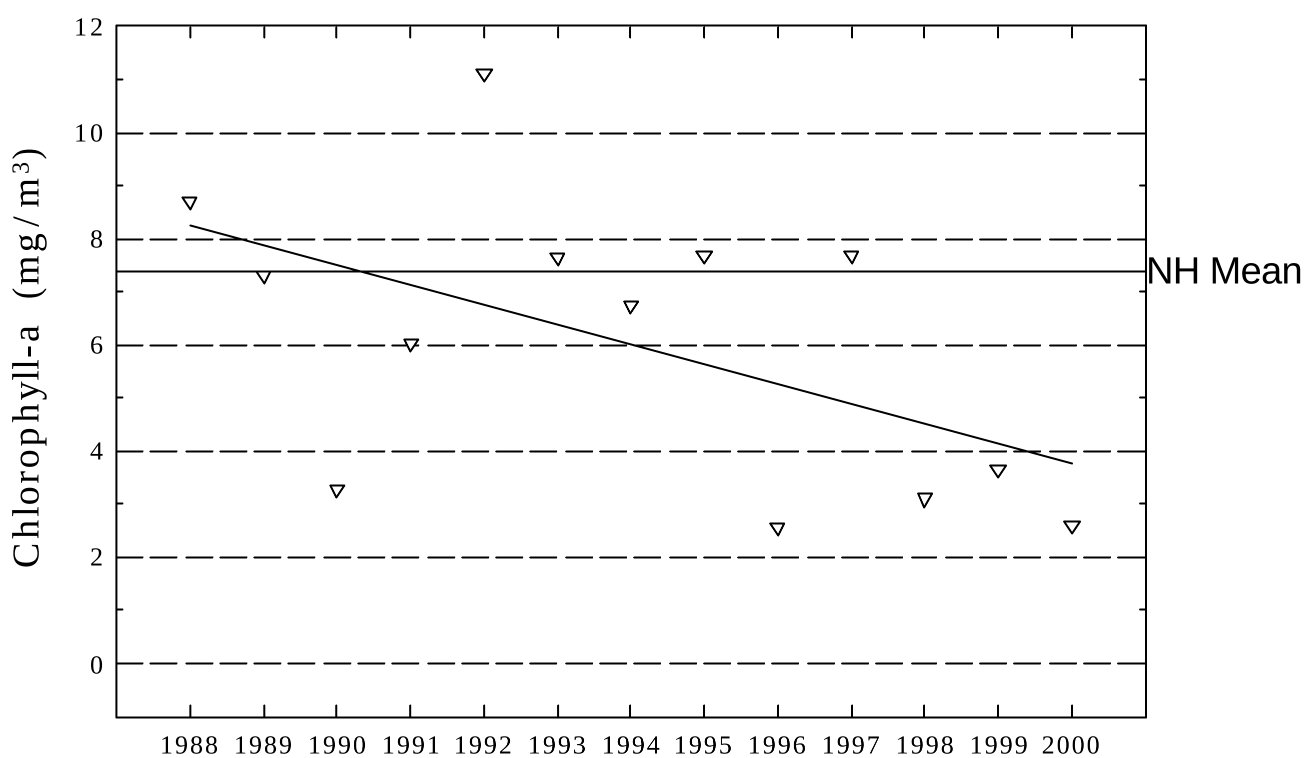
Answers to Common Lake Questions, NHDES-WSPCD-92-12, NHDES Booklet, (603) 271-3503.

Chase Pond

Figure 1. Monthly and Historical Chlorophyll-a Results



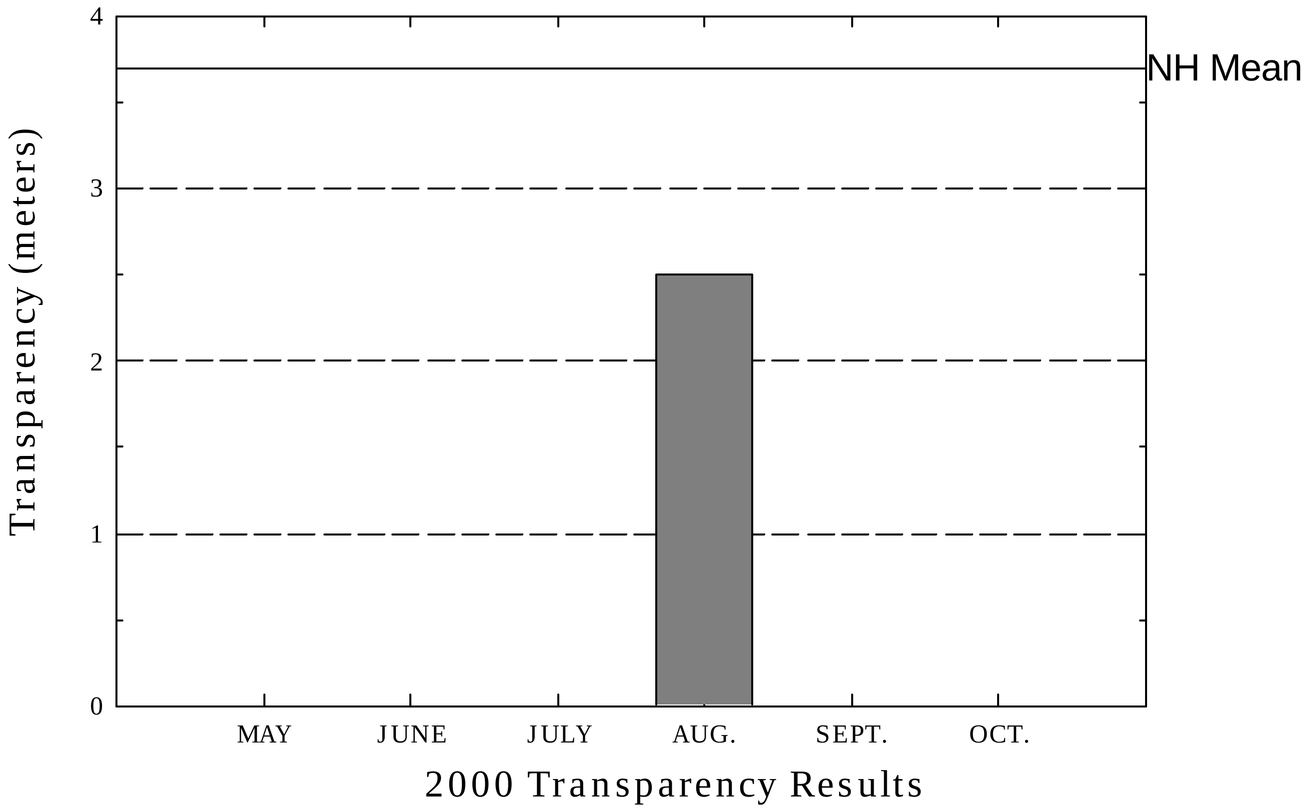
2000 Chlorophyll-a Results

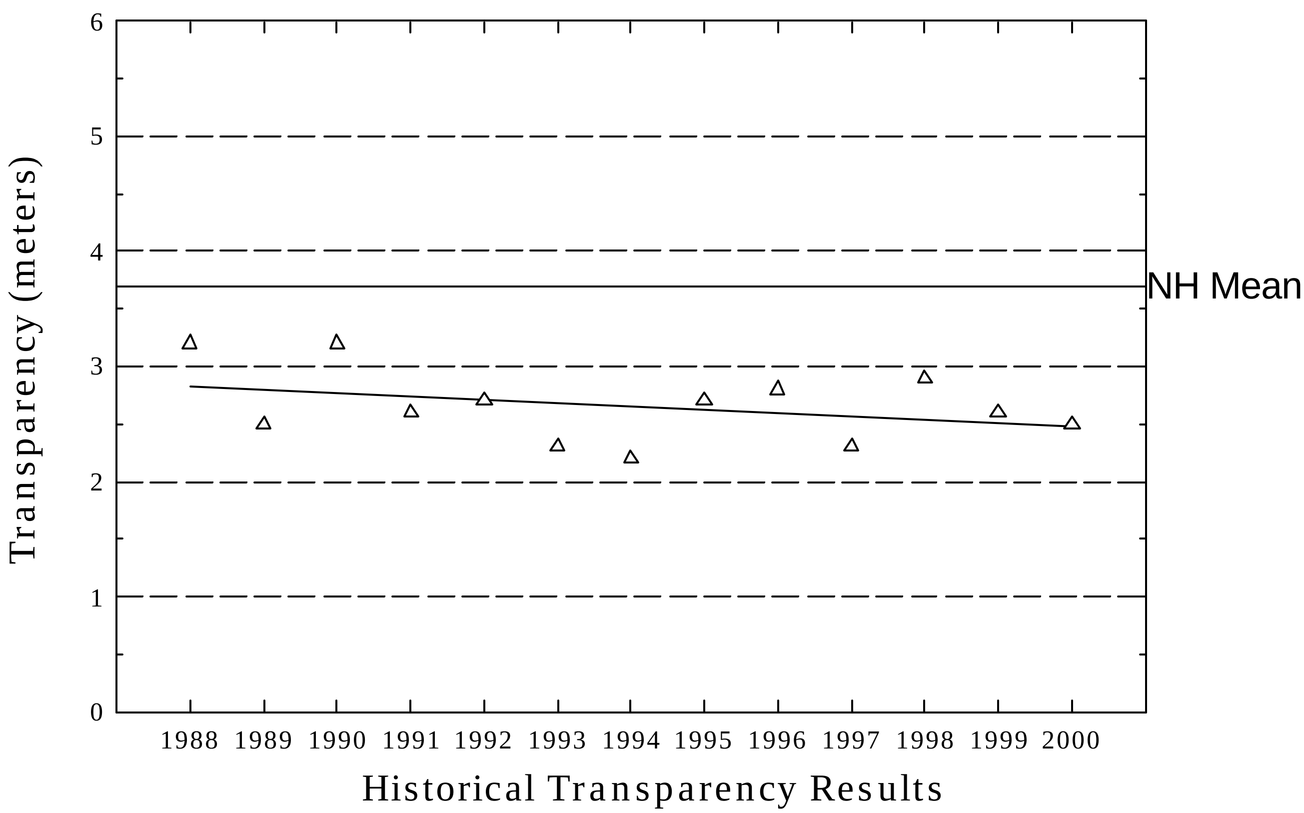


Historical Chlorophyll-a Results

Chase Pond

Figure 2. Monthly and Historical Transparency Results





Chase Pond

Figure 3. Monthly and Historical Total Phosphorus Data.

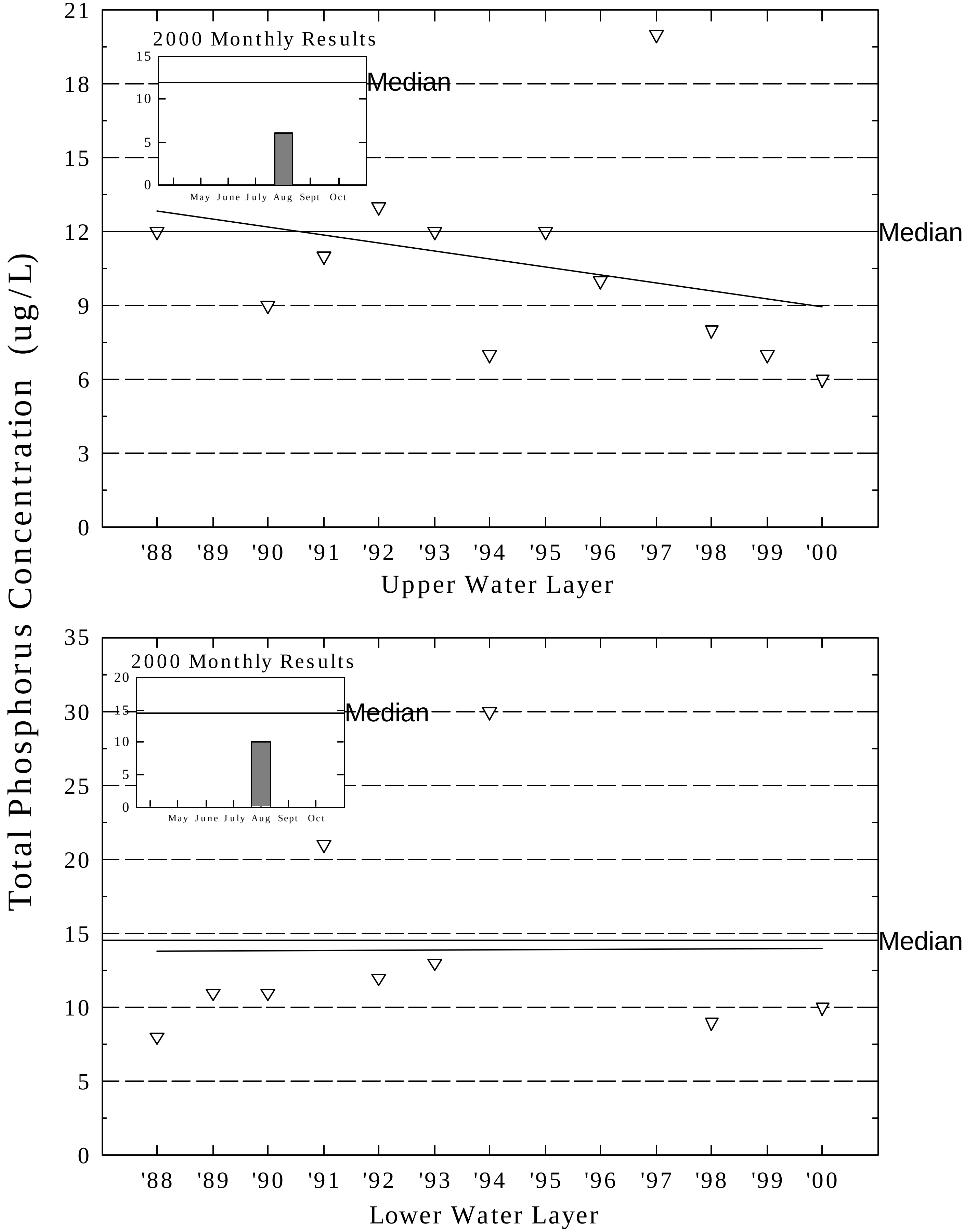


Table 1.

CHASE POND

WILMOT

Chlorophyll-a results (mg/m^3) for current year and historical sampling periods.

Year	Minimum	Maximum	Mean
1988	8.71	8.71	8.71
1989	7.30	7.30	7.30
1990	3.28	3.28	3.28
1991	6.02	6.02	6.02
1992	11.11	11.11	11.11
1993	7.66	7.66	7.66
1994	6.75	6.75	6.75
1995	7.68	7.68	7.68
1996	2.56	2.56	2.56
1997	7.70	7.70	7.70
1998	3.11	3.11	3.11
1999	3.65	3.65	3.65
2000	2.61	2.61	2.61

Table 2.

CHASE POND

WILMOT

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
08 / 22 / 1988	CHRYSOSPHAERELLA	55
	DINOBRYON	41
08 / 02 / 1989	DINOBRYON	40
	ASTERIONELLA	35
	RHIZOSOLENIA	
08 / 20 / 1990	DINOBRYON	47
08 / 29 / 1991	TABELLARIA	69
	PEDIASTRUM	13
	STAURASTRUM	7
08 / 17 / 1992	TABELLARIA	96
08 / 25 / 1993	DINOBRYON	47
	CHRYSOSPHAERELLA	18
	MELOSIRA	15
08 / 01 / 1994	TABELLARIA	66
	MELOSIRA	15
08 / 17 / 1995	DINOBRYON	38
	MELOSIRA	33
	CHRYSOSPHAERELLA	14
08 / 06 / 1996	RHIZOSOLENA	28
	TABELLARIA	21
	MELOSIRA	19
08 / 06 / 1997	DINOBRYON	30
	MELOSIRA	22
	RHIZOSOLENIA	19
07 / 13 / 1998	MELOSIRA	60
	RHIZOSOLENIA	30
	ASTERIONELLA	3

Table 2.

CHASE POND

WILMOT

Phytoplankton species and relative percent abundance.

Summary for current and historical sampling seasons.

Date of Sample	Species Observed	Relative % Abundance
08 / 03 / 1999	TABELLARIA	41
	LYNGBYA	29
	CHRYSOSPHAERELLA	18
08 / 03 / 2000	ASTERIONELLA	35
	RHIZOSOLENIA	18
	MALLOMONAS	14

Table 3.

CHASE POND

WILMOT

Summary of current and historical Secchi Disk transparency results (in meters).

Year	Minimum	Maximum	Mean
1988	3.2	3.2	3.2
1989	2.4	2.5	2.4
1990	3.2	3.2	3.2
1991	2.6	2.6	2.6
1992	2.7	2.7	2.7
1993	2.3	2.3	2.3
1994	2.2	2.2	2.2
1995	2.7	2.7	2.7
1996	2.8	2.8	2.8
1997	2.3	2.3	2.3
1998	2.9	2.9	2.9
1999	2.6	2.6	2.6
2000	2.5	2.5	2.5

Table 4.

CHASE POND
WILMOT

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	**Year**	**Minimum**	**Maximum**	**Mean**
ABOVE INTLET				
	1999	6.76	6.76	6.76
EPILIMNION				
	1988	6.67	6.67	6.67
	1989	6.89	6.89	6.89
	1990	6.77	6.77	6.77
	1991	6.90	6.90	6.90
	1992	6.80	6.80	6.80
	1993	7.10	7.10	7.10
	1994	6.95	6.95	6.95
	1995	7.07	7.07	7.07
	1996	6.59	6.59	6.59
	1997	6.89	6.89	6.89
	1998	6.68	6.79	6.73
	1999	6.61	6.61	6.61
	2000	6.49	6.49	6.49
HYPOLIMNION				
	1988	5.72	5.72	5.72
	1989	6.78	6.78	6.78
	1990	6.57	6.57	6.57
	1991	6.58	6.58	6.58
	1992	6.67	6.67	6.67
	1993	6.93	6.93	6.93
	1994	6.43	6.43	6.43
	1998	6.89	6.89	6.89
	2000	6.43	6.43	6.43

Table 4.

CHASE POND
WILMOT

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
ABOVE INTLET				
	1999	6.76	6.76	6.76
EPILIMNION				
	1988	6.67	6.67	6.67
	1989	6.89	6.89	6.89
	1990	6.77	6.77	6.77
	1991	6.90	6.90	6.90
	1992	6.80	6.80	6.80
	1993	7.10	7.10	7.10
	1994	6.95	6.95	6.95
	1995	7.07	7.07	7.07
	1996	6.59	6.59	6.59
	1997	6.89	6.89	6.89
	1998	6.68	6.79	6.73
	1999	6.61	6.61	6.61
	2000	6.49	6.49	6.49
HYPOLIMNION				
	1988	5.72	5.72	5.72
	1989	6.78	6.78	6.78
	1990	6.57	6.57	6.57
	1991	6.58	6.58	6.58
	1992	6.67	6.67	6.67
	1993	6.93	6.93	6.93
	1994	6.43	6.43	6.43
	1998	6.89	6.89	6.89
	2000	6.43	6.43	6.43

Table 4.

CHASE POND
WILMOT

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
INLET				
	1988	6.25	6.25	6.25
	1989	6.94	6.94	6.94
	1990	6.64	6.64	6.64
	1991	6.86	6.86	6.86
	1992	6.97	6.97	6.97
	1993	7.01	7.01	7.01
	1994	7.01	7.01	7.01
	1995	6.73	6.73	6.73
	1996	6.31	6.31	6.31
	1997	6.95	6.95	6.95
	1998	6.60	6.60	6.60
	1999	6.65	6.65	6.65
	2000	6.55	6.55	6.55
OUTLET				
	1989	6.85	6.85	6.85
	1990	6.54	6.54	6.54
	1991	7.03	7.03	7.03
	1992	6.71	6.71	6.71
	1993	7.15	7.15	7.15
	1994	7.12	7.12	7.12
	1995	6.89	6.89	6.89
	1996	6.43	6.43	6.43
	1997	6.93	6.93	6.93
	1998	6.75	6.75	6.75
	1999	6.79	6.79	6.79
	2000	6.45	6.45	6.45

Table 4.

CHASE POND
WILMOT

pH summary for current and historical sampling seasons.
Values in units, listed by station and year.

Station	Year	Minimum	Maximum	Mean
INLET				
	1988	6.25	6.25	6.25
	1989	6.94	6.94	6.94
	1990	6.64	6.64	6.64
	1991	6.86	6.86	6.86
	1992	6.97	6.97	6.97
	1993	7.01	7.01	7.01
	1994	7.01	7.01	7.01
	1995	6.73	6.73	6.73
	1996	6.31	6.31	6.31
	1997	6.95	6.95	6.95
	1998	6.60	6.60	6.60
	1999	6.65	6.65	6.65
	2000	6.55	6.55	6.55
OUTLET				
	1989	6.85	6.85	6.85
	1990	6.54	6.54	6.54
	1991	7.03	7.03	7.03
	1992	6.71	6.71	6.71
	1993	7.15	7.15	7.15
	1994	7.12	7.12	7.12
	1995	6.89	6.89	6.89
	1996	6.43	6.43	6.43
	1997	6.93	6.93	6.93
	1998	6.75	6.75	6.75
	1999	6.79	6.79	6.79
	2000	6.45	6.45	6.45

Table 5.

CHASE POND

WILMOT

Summary of current and historical Acid Neutralizing Capacity.
Values expressed in mg/L as CaCO .

Epilimnetic Values

Year	Minimum	Maximum	Mean
1988	6.80	6.80	6.80
1989	7.00	7.00	7.00
1990	3.90	3.90	3.90
1991	7.00	7.00	7.00
1992	7.10	7.10	7.10
1993	7.70	7.70	7.70
1994	9.40	9.40	9.40
1995	7.40	7.40	7.40
1996	6.60	6.60	6.60
1997	9.10	9.10	9.10
1998	6.10	6.50	6.30
1999	8.30	8.30	8.30
2000	4.80	4.80	4.80

Table 6.

CHASE POND
WILMOT

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
INLET				
	1988	44.9	44.9	44.9
	1989	54.9	54.9	54.9
	1990	41.4	41.4	41.4
	1991	57.3	57.3	57.3
	1992	60.3	60.3	60.3
	1993	72.8	72.8	72.8
	1994	78.6	78.6	78.6
	1995	51.8	51.8	51.8
	1996	65.2	65.2	65.2
	1997	85.8	85.8	85.8
	1998	55.2	55.2	55.2
	1999	65.8	65.8	65.8
	2000	50.7	50.7	50.7
OUTLET				
	1989	57.2	57.2	57.2
	1990	42.5	42.5	42.5
	1991	55.6	55.6	55.6
	1992	56.8	56.8	56.8
	1993	70.3	70.3	70.3
	1994	70.5	70.5	70.5
	1995	57.6	57.6	57.6
	1996	54.7	54.7	54.7
	1997	67.7	67.7	67.7
	1998	52.2	52.2	52.2
	1999	71.3	71.3	71.3
	2000	55.4	55.4	55.4

Table 6.

CHASE POND
WILMOT

Specific conductance results from current and historic sampling seasons. Results in uMhos/cm.

Station	Year	Minimum	Maximum	Mean
ABOVE INTLET				
	1999	64.5	64.5	64.5
EPILIMNION				
	1988	52.5	52.5	52.5
	1989	57.3	57.3	57.3
	1990	43.1	43.1	43.1
	1991	56.3	56.3	56.3
	1992	56.8	56.8	56.8
	1993	70.7	70.7	70.7
	1994	71.0	71.0	71.0
	1995	57.8	57.8	57.8
	1996	56.3	56.3	56.3
	1997	68.3	68.3	68.3
	1998	51.4	52.0	51.7
	1999	71.6	71.6	71.6
	2000	52.3	52.3	52.3
HYPOLIMNION				
	1988	52.8	52.8	52.8
	1989	56.4	56.4	56.4
	1990	41.6	41.6	41.6
	1991	59.4	59.4	59.4
	1992	57.5	57.5	57.5
	1993	70.3	70.3	70.3
	1994	78.7	78.7	78.7
	1998	52.9	52.9	52.9
	2000	53.3	53.3	53.3

Table 8.

CHASE POND
WILMOT

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
ABOVE INTLET				
	1999	1	1	1
EPILIMNION				
	1988	12	12	12
	1989	15	15	15
	1990	9	9	9
	1991	11	11	11
	1992	13	13	13
	1993	12	12	12
	1994	7	7	7
	1995	12	12	12
	1996	10	10	10
	1997	20	20	20
	1998	8	9	8
	1999	7	7	7
	2000	6	6	6
HYPOLIMNION				
	1988	8	8	8
	1989	11	11	11
	1990	11	11	11
	1991	21	21	21
	1992	12	12	12
	1993	13	13	13
	1994	30	30	30
	1998	9	9	9
	2000	10	10	10

Table 8.

CHASE POND
WILMOT

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
INLET				
	1988	5	5	5
	1989	7	7	7
	1990	11	11	11
	1991	6	6	6
	1992	6	6	6
	1993	16	16	16
	1994	10	10	10
	1995	8	8	8
	1996	10	10	10
	1997	11	11	11
	1998	7	7	7
	1999	4	4	4
	2000	6	6	6
OUTLET				
	1988	5	5	5
	1989	8	8	8
	1990	9	9	9
	1991	7	7	7
	1992	9	9	9
	1993	9	9	9
	1994	14	14	14
	1995	10	10	10
	1996	11	11	11
	1997	13	13	13
	1998	11	11	11
	1999	9	9	9

Table 8.

CHASE POND

WILMOT

Summary historical and current sampling season Total Phosphorus data. Results in ug/L.

Station	Year	Minimum	Maximum	Mean
	2000	9	9	9

Table 9.

CHASE POND

WILMOT

Current year dissolved oxygen and temperature data.

Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
	August 3, 2000		
0.1	21.9	8.3	94.2
1.0	20.6	8.0	89.3
2.0	19.7	8.0	87.7
3.0	18.8	5.5	59.0

Table 10.

CHASE POND

WILMOT

Historic Hypolimnetic dissolved oxygen and temperature data.

Date	Depth (meters)	Temperature (celsius)	Dissolved Oxygen (mg/L)	Saturation (%)
August 22, 1988	3.0	21.9	7.6	84.0
August 2, 1989	2.4	22.1	9.4	107.0
August 20, 1990	3.5	21.5	8.6	98.0
August 29, 1991	3.0	20.5	3.2	35.8
August 17, 1992	3.0	18.5	5.6	60.0
August 1, 1994	3.0	21.3	0.5	6.0
August 17, 1995	3.0	22.6	3.0	34.0
August 6, 1996	2.5	21.1	5.9	65.0
August 6, 1997	2.5	22.6	7.1	81.0
July 13, 1998	2.5	20.8	7.8	85.0
August 3, 1999	2.5	25.4	6.5	79.7
August 3, 2000	3.0	18.8	5.5	59.0

Table 11.

CHASE POND
WILMOT

Summary of current year and historic turbidity sampling.
Results in NTU's.

Station	Year	Minimum	Maximum	Mean
ABOVE INTLET				
	1999	0.3	0.3	0.3
EPILIMNION				
	1997	0.8	0.8	0.8
	1999	1.0	1.0	1.0
	2000	0.4	0.4	0.4
HYPOLIMNION				
	2000	0.6	0.6	0.6
INLET				
	1997	0.9	0.9	0.9
	1999	0.3	0.3	0.3
	2000	0.3	0.3	0.3
OUTLET				
	1997	0.9	0.9	0.9
	1999	0.7	0.7	0.7
	2000	0.5	0.5	0.5